



Update Manual



2005-2 500/600 Series Snow Thrower Update

NOTE: These materials are for use by trained technicians who are experienced in the service and repair of outdoor power equipment of the kind described in this publication, and are not intended for use by untrained or inexperienced individuals. These materials are intended to provide supplemental information to assist the trained technician. Untrained or inexperienced individuals should seek the assistance of an experienced and trained professional. Read, understand, and follow all instructions and use common sense when working on power equipment. This includes the contents of the product's Operators Manual, supplied with the equipment. No liability can be accepted for any inaccuracies or omission in this publication, although care has been taken to make it as complete and accurate as possible at the time of publication. However, due to the variety of outdoor power equipment and continuing product changes that occur over time, updates will be made to these instructions from time to time. Therefore, it may be necessary to obtain the latest materials before servicing or repairing a product. The company reserves the right to make changes at any time to this publication without prior notice and without incurring an obligation to make such changes to previously published versions. Instructions, photographs and illustrations used in this publication are for reference use only and may not depict actual model and component parts.

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500 and 600 SERIES 2-STAGE SNOW THROWER

1. INTRODUCTION

- 1.1. The 2005-2 manufacturing season has brought a few subtle changes to the medium frame snow throwers.
- 1.2. Disclaimer: This service manual was intended for use by trained technicians. The information contained in the manual is current and accurate at the time of writing, but is subject to change without notice.
- 1.3. The medium frame 2- stage snow throwers are designed with the residential user with a large amount of area to clear or just simply want to get the job done sooner. The additional weight and traction of a 2-stage snow thrower makes it more suitable to heavy snow fall areas. See Figure 1.3.



Figure 1.3

- 1.4. The 500 and 600 series two-stage snow thrower model lines are very similar to one another and are both covered in this manual. Within the product lines there are several variations that are covered in this manual as well. The technician is responsible for identifying the features on any individual machine they are working on, and referring to the appropriate sections of this manual. Those features (variations) include:
 - Power Steering or locked drive
 - Direct or cable operated gear selector
 - Optional lighting
 - Optional 120V. electric start

- Various dash panel and engine shroud styles
2. CABLE ADJUSTMENTS
 - 2.1. Stop the engine and allow it to cool, disconnect the spark plug wire and ground it to the engine.
 - 2.2. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the fuel cap and the filler neck. Carefully tip the snow thrower forward so it rests on the auger housing.
 - 2.3. Loosen the hex screws that secure the bracket that guides the cable needing adjustment (3/8" wrench). See Figure 2.3.

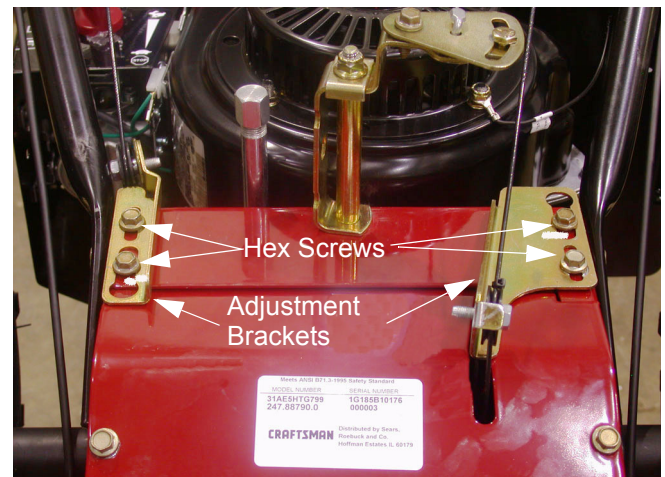


Figure 2.3

- 2.4. Slide the bracket upward to add slack to the cable or downward to add tension to the cable.

NOTE: The cables should be straight without any tension to the drive or auger when the handle is not engaged.

NOTE: If either bracket reaches the end of its travel without achieving correct adjustment, use a straight-edge to confirm that the handle bars were not bent in transport or storage.
- 2.5. The cables are adjusted correctly when light pressure (1lb {.46kg}) results in 1/2" (12.7mm) of deflection on the cable-and- there is no "creep" on the drive system.

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3. AUGER BELT REMOVAL/REPLACEMENT

- 3.1. Prior to servicing, or replacing any belts stop engine and allow it to cool then disconnect spark plug and ground it to the engine
- 3.2. Remove the belt cover from between the auger housing and the engine with a 3/8" socket. See Figure 3.2.

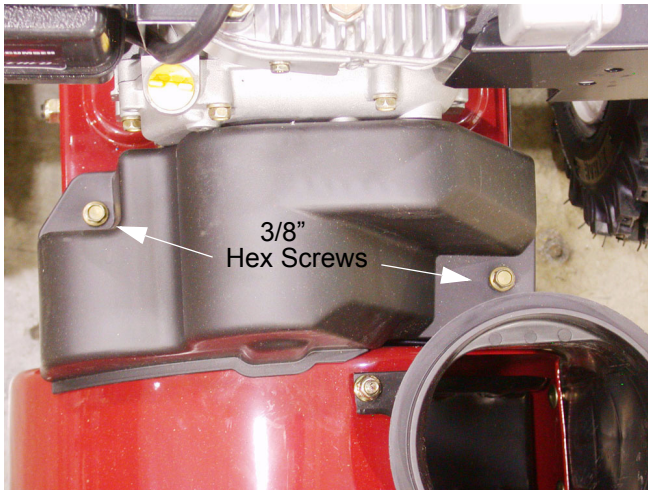


Figure 3.2

- 3.3. Loosen the idler pulley with a 1/2" wrench to provide the slack needed to free the belt.

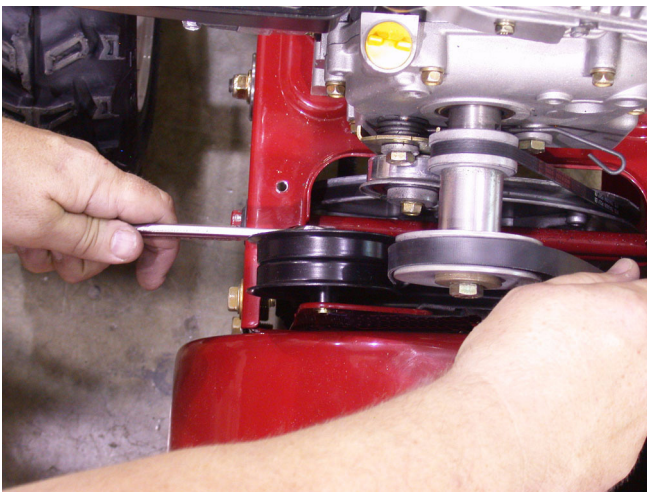


Figure 3.3

- 3.4. Roll the belt over the engine pulley.
- 3.5. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the cap and the filler neck.
- 3.6. Carefully Tip the snow thrower forward so it rests on the auger housing.

- 3.7. Remove the access panel located on the bottom of the machine between the wheels. See Figure 3.7.

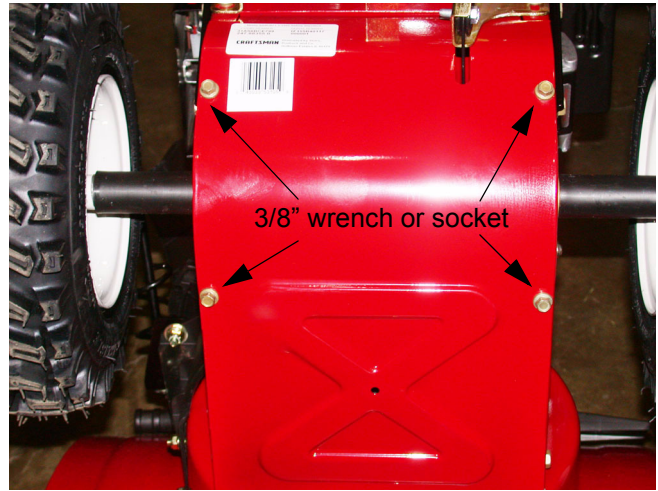


Figure 3.7

- 3.8. With the access panel removed, the variable speed disc drive will be exposed. See Figure 3.8.

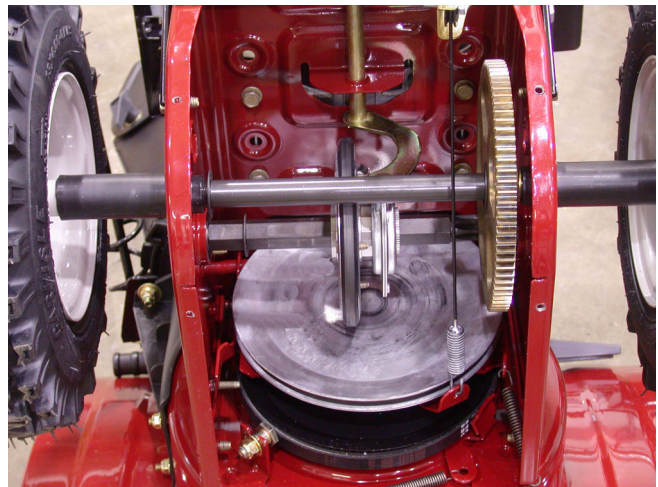


Figure 3.8

500 and 600 SERIES 2-STAGE SNOW THROWER

- 3.9. Loosen the belt guide (shoulder bolt) with a 3/4" wrench and a 9/16" wrench. See Figure 3.9.

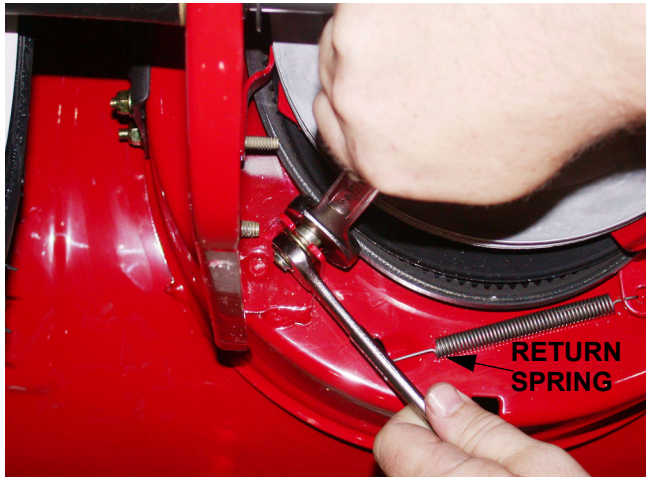


Figure 3.9

- 3.10. Unhook the return spring on the idler bracket
3.11. Pull the belt down past the Auger pulley.
See Figure 3.11.

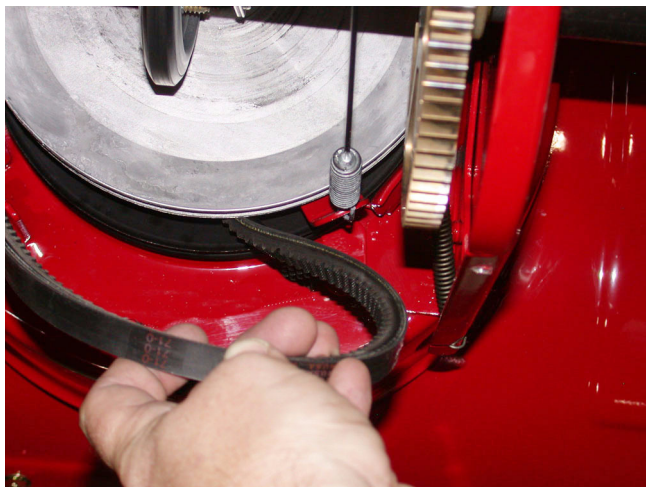


Figure 3.11

- 3.12. EXamine the removed belt: If it failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service
3.13. Install the new belt by reversing the removal procedure.
3.14. Run/test/adjust the auger drive system before returning the snow thrower to service.

4. TRACTION DRIVE BELT REMOVAL/REPLACEMENT

- 4.1. Remove auger belt as described on the auger drive belt removal section of the manual.

NOTE: A coil spring on previous models used to provide tension to the traction drive belt. For the 2005/2 manufacturing season the coil spring was replaced with a torsion spring. See Figure 4.1.

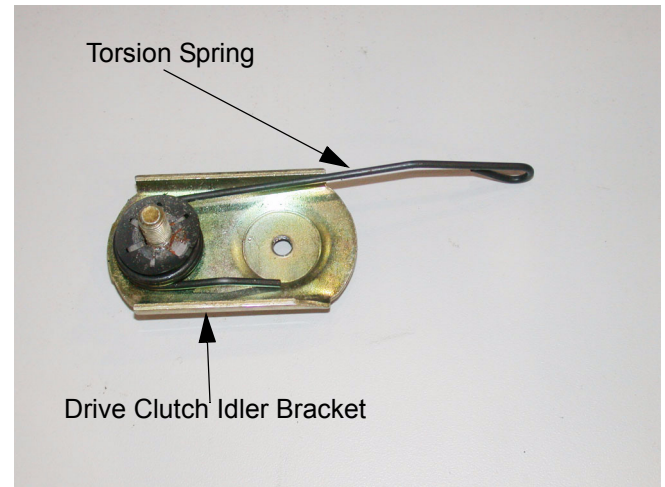


Figure 4.1

- 4.2. The torsion spring is mounted below the crank shaft and can be removed with a 1/2" socket.
4.3. Relieve the tension from the drive belt by using a 3/8" wrench to apply slight upward pressure on the torsion spring to free the belt from the engine pulley.

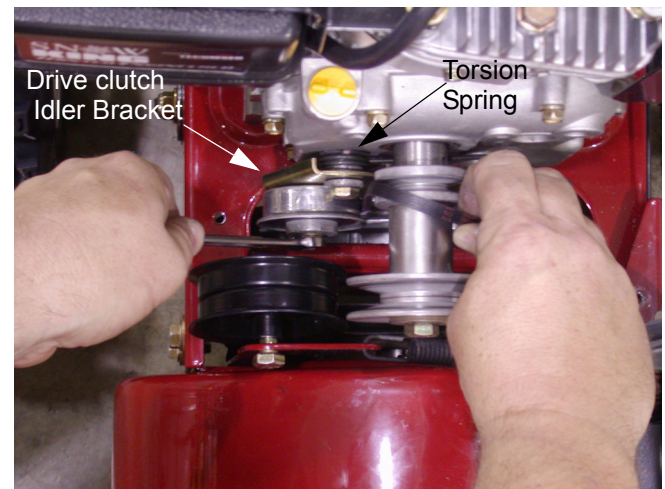


Figure 4.3

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- 4.4. Work the belt off the bottom of the drive plate by rolling it between the drive disc and drive plate. See Figure 4.4.

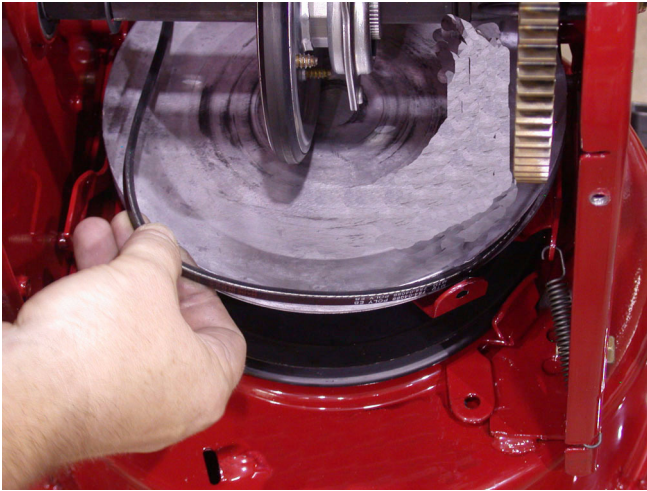


Figure 4.4

- 4.5. Pull the belt up through the top of the belt housing.
- 4.6. Examine the removed belt: If it failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 4.7. Install new belt by reversing the removal procedure.
- 4.8. Run/.test/adjust the traction drive belt before returning the snow thrower to service.

5. AUGER CLUTCH CONTROL CABLE

- 5.1. The auger control is on the left side of the handle bars.
- 5.2. Place a mark on the adjustment bracket to the frame. White out or a grease pencil would be good because it is easily removed. See Figure 5.2.



Figure 5.2

- 5.3. Loosen the hex screws securing the adjustments bracket to release tension off of the cables.
- 5.4. Detach the z-fitting end of the cable from the control handles with a pair of needle nose pliers. See Figure 5.4.



Figure 5.4

- 5.5. Loosen the cable guide pulleys on the adjustment bracket and slip the cable out of the pulley groove.

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- 5.6. Remove belt cover
- 5.7. Loosen the second guide pulley and again slip the pulley from the groove. See Figure 5.7.



Figure 5.7

- 5.8. Detach the spring end of the cable from the Idler bracket. See Figure 5.9.
- 5.9. Detach the spring end of the cable from the idler bracket.

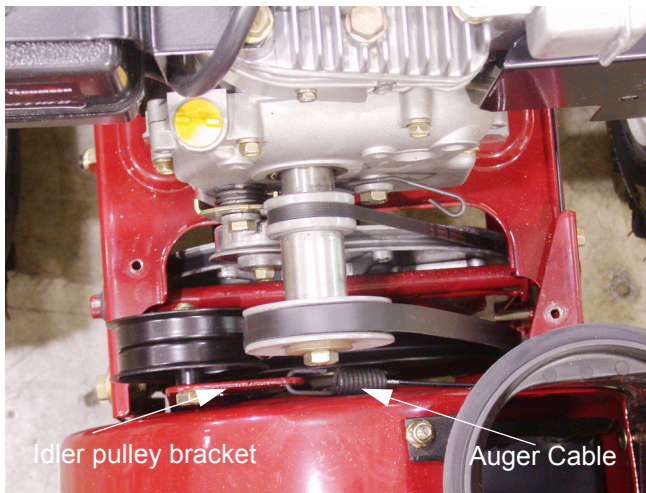


Figure 5.9

- 5.10. Examine the removed cable: If the failure is not due to normal wear, identify and correct cause before returning to service.
- 5.11. Install new cable by reversing the removal procedure.
- 5.12. Run/test/adjust the auger control cable before returning to service.

6. TRACTION DRIVE CLUTCH CONTROL CABLE

- 6.1. The drive control is on the right side of the handle bars
- 6.2. Stop engine and allow it to cool disconnect disconnect the spark plug and ground it to the engine.
- 6.3. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent with a plastic bag between the cap and the filler neck.
- 6.4. Carefully tip the snow thrower forward so it rests on the auger housing.
- 6.5. Mark the bracket to the frame as demonstrated in figure 5.2
- 6.6. Detach the z-fitting end of the cable from the engagement handle.

NOTE: The cable routes down to the cable guide pulley that is mounted on the drive cable adjustment bracket.

- 6.7. Remove the bottom access panel.
- 6.8. Detach the spring end from the friction wheel support bracket.

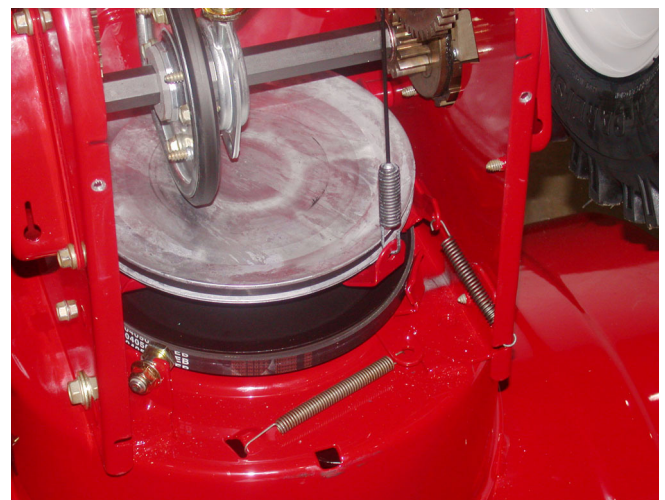


Figure 6.8

- 6.9. Examine the removed cable: If the cable failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 6.10. Install new cable by reversing the removal procedure.
- 6.11. Run/test/adjust the tension on the traction drive clutch control cable.

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7. SPEED SELECTOR CABLE

- 7.1. A cable has replaced the rod to link from the speed control lever to the speed control assembly on some models.

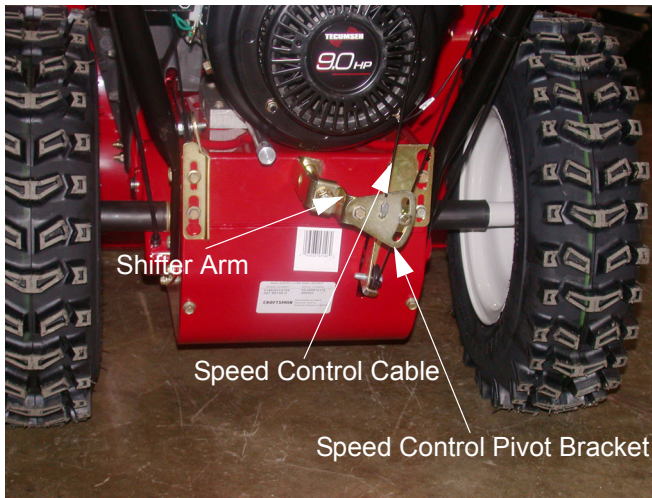


Figure 7.1

- 7.2. With the engine stopped and allowed to cool disconnect the spark plug wire and ground it to the engine
- 7.3. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the fuel cap and the filler neck.
- 7.4. Carefully tip the snow thrower forward so it rests on the auger housing
- 7.5. Remove the bottom access panel.
- 7.6. Place a block on the left side of the drive wheel to hold the shifter arm stationary. See Figure 7.6.

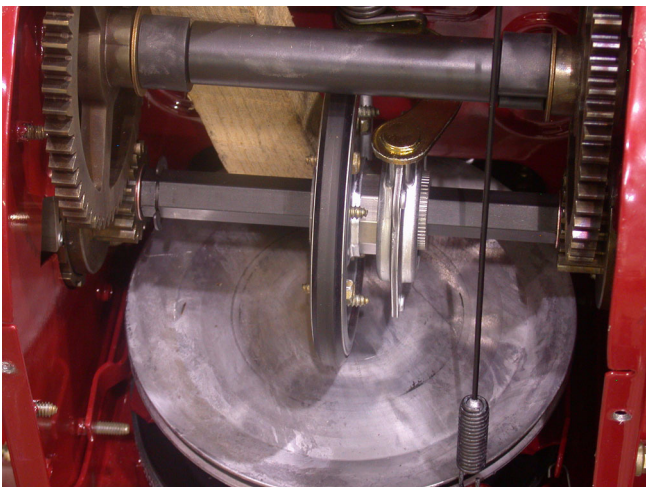


Figure 7.6

- 7.7. Release the tension on the Speed selector cable with two 7/16" wrenches. See Figure 7.7.

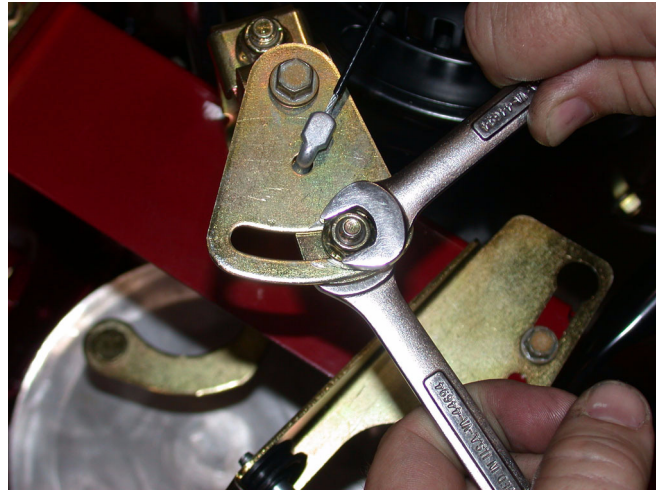


Figure 7.7

- 7.8. Loosen the cable screw and nut enough to free the z-fitting from the from the Speed control pivot bracket.



Figure 7.8

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- 7.9. Remove the 5/16" hex screw securing the barrel side of the cable.



Figure 7.9

NOTE: The bracket securing the cable to the shift lever is (2) pieces

- 7.10. Examine the removed cable: If it failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 7.11. Install new cable by reversing the removal procedure.
- 7.12. Run/test/Adjust the speed control cable before returning to service.
- 7.13. The torsion spring to the maintains continuous tension on the speed control cable.

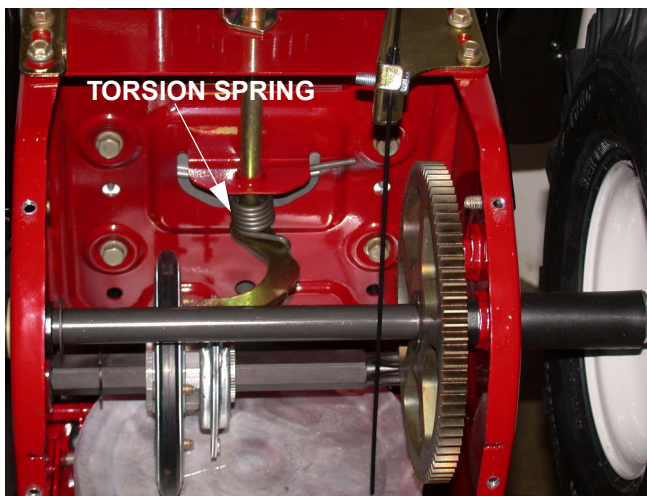


Figure 7.13

8. AXLE ASSEMBLY REMOVAL(600 SERIES, NON-STEERABLE)

- 8.1. With the engine stopped and allowed to cool disconnect the spark plug wire and ground it to the engine.
- 8.2. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the cap and the filler neck
- 8.3. Carefully tip the snow thrower forwards so it rest on the auger housing
- 8.4. Remove the bottom access panel. See Figure 8.4.

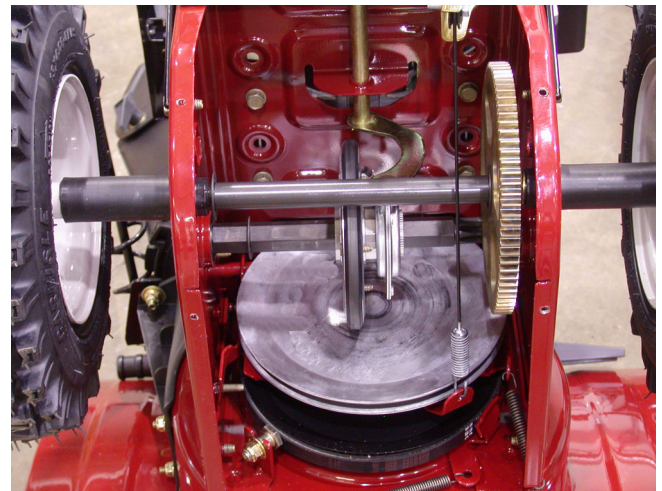


Figure 8.4

- 8.5. Remove the wheels with a 1/2" socket.



Figure 8.5

NOTE: The end of the axle shaft are double - D.

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- 8.6. Slide the spacers and washers off of the axle.
See Figure 8.6.

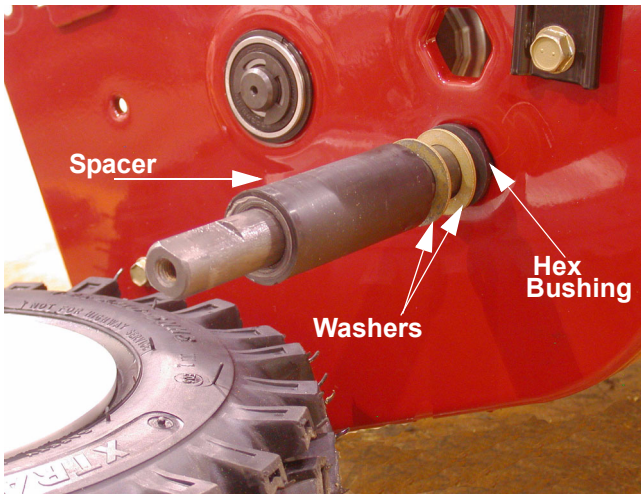


Figure 8.6

NOTE: There are 2 shim spacers on the left side and only 1 on the right side.

- 8.7. Slide both hex bushings off the axle.
8.8. Slide the shaft to the left while holding the gear from moving.

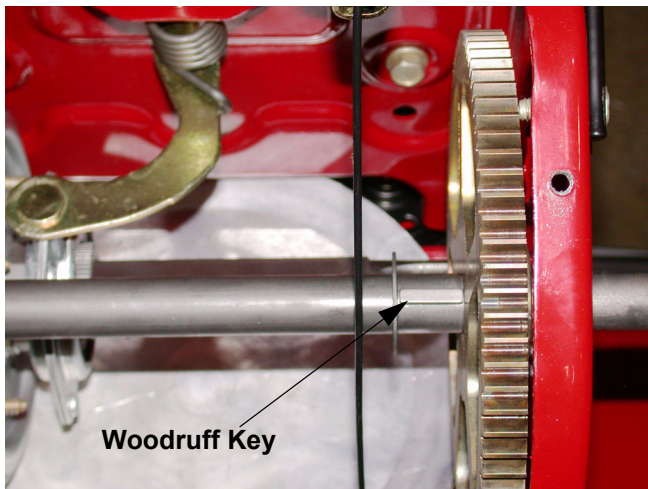


Figure 8.8

NOTE: There is a woodruff key on the shaft and can easily be lost if not careful.

- 8.9. The axle is supported by a pair of hex flange bushings: one on each side of the frame. Carefully pry each one out of the frame and slide it off the end of the axle the shaft out of the housing.

NOTE: Anytime it is necessary to remove bushings carefully inspect for normal wear and replace if wear is excessive.

- 8.10. Slide the axle out completely.

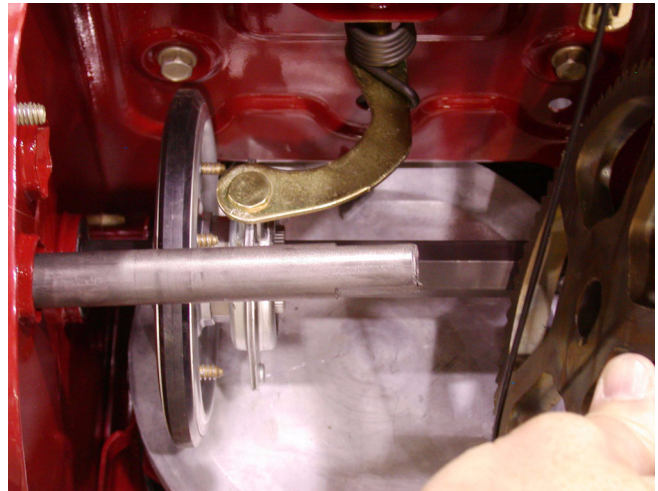


Figure 8.10

- 8.11. Examine the removed parts: If any of the parts failed because of something other than normal wear, identify and correct the cause before returning the snow thrower back to service.
8.12. Install new/old parts by reversing the removal procedure.
8.13. Run/ test the snow thrower before returning the snow thrower back to service.

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9. 500 SERIES AXLE REMOVAL (STEER ABLE)

- 9.1. The steerable units are unique in the way they propel. While the narrow axle shaft the steerable snow throwers use a split axle to provide the ability to drive either or both ways. See Figure 9.1.

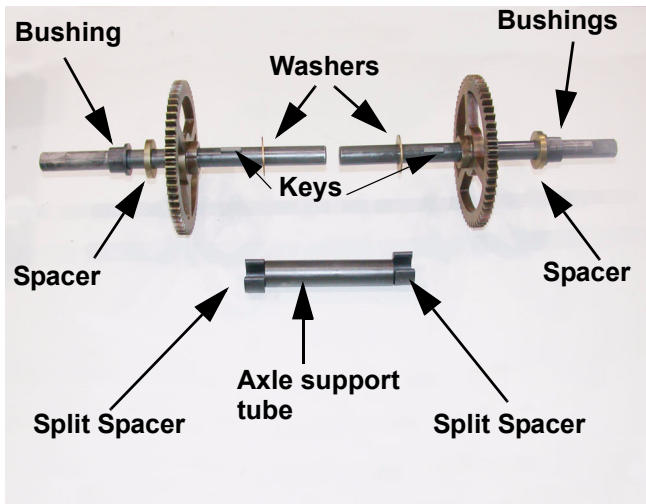


Figure 9.1

NOTE: There aren't any chains used in the drive system

- 9.2. Remove the wheels, spacers, and shims as mentioned previously.
- 9.3. Carefully pry the 2 split bushings from the axle. See Figure 9.3.

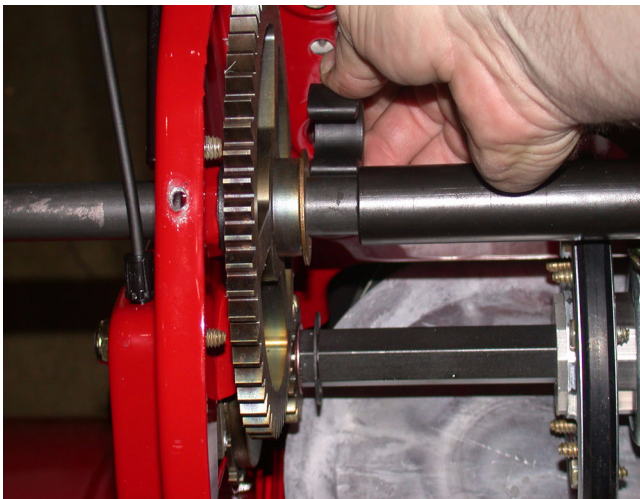


Figure 9.3

- 9.4. Slide the large 56T gear inward while gently pulling on the axle to expose the key that engages the gear. See Figure 9.4.

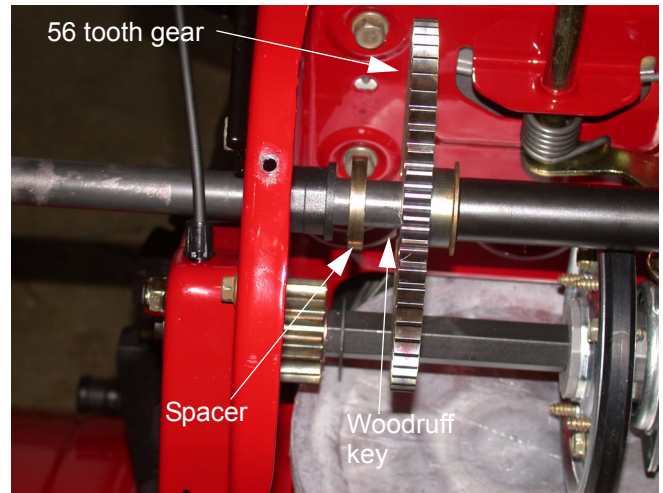


Figure 9.4

- 9.5. Remove the key with a pair of pliers or screw driver.
- 9.6. Hold the axle support tube and pull the shaft from the housing.
- 9.7. Remove other side axle in the same manner.
- 9.8. Examine the removed parts: If failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 9.9. Install the cable assembly by reversing the removal procedure.
- 9.10. Run/test the snow thrower before returning it to service.

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10. DRIVE SHAFT ASSEMBLY (600 SERIES)

- 10.1. Remove the axle assembly as described in axle assembly removal
- 10.2. Pry off the E-ring off the left side of unit holding the Drive shaft assembly in. See Figure 10.2.

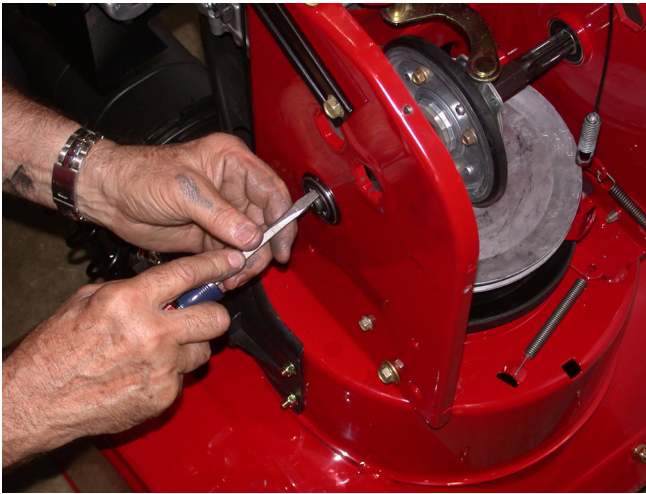


Figure 10.2

- 10.3. Remove the Bolt from the end of the shaft securing the hex shaft to the frame with a 9/16" wrench See Figure 10.3.

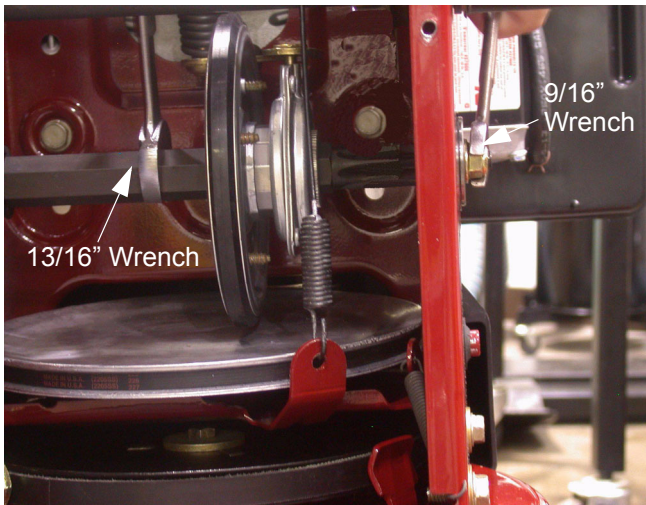


Figure 10.3

NOTE: to prevent the hex shaft from turning while removing the exterior screw hold the hex shaft with a 13/16" wrench.

- 10.4. Rotate the friction wheel assembly forward to free the collar from the pin on the shift assembly.

- 10.5. Maneuver the shaft partially through the wheel drive frame then tilt the assembly forward to free it from the housing. See Figure 10.5.

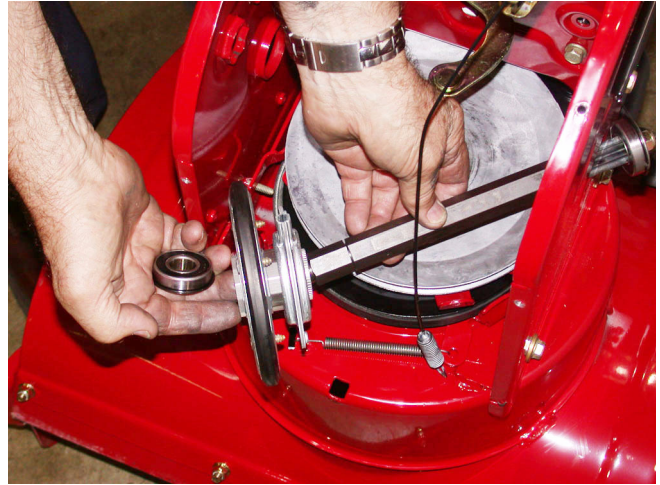


Figure 10.5

- 10.6. Examine the remove parts: if any failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 10.7. Install the drive shaft assembly by reversing the removal procedure.
- 10.8. Run/ test the drive shaft before returning the snow thrower to service
11. **500 DRIVE ASSEMBLY (500 SERIES STEER-ABLE)**
 - 11.1. Stop engine allow to cool disconnect the spark plug and ground it to the engine.
 - 11.2. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the fuel cap and the filler neck.
 - 11.3. Carefully tip the snow thrower forward so it rests the auger housing.
 - 11.4. Remove the access panel with 3/8" socket.
 - 11.5. Remove both wheels with a 1/2" socket.
 - 11.6. Loosen and remove the screw and nut that holds the adjustment on the shifter cable.

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- 11.7. Remove the four screws that hold the right side Planetary gear housing.

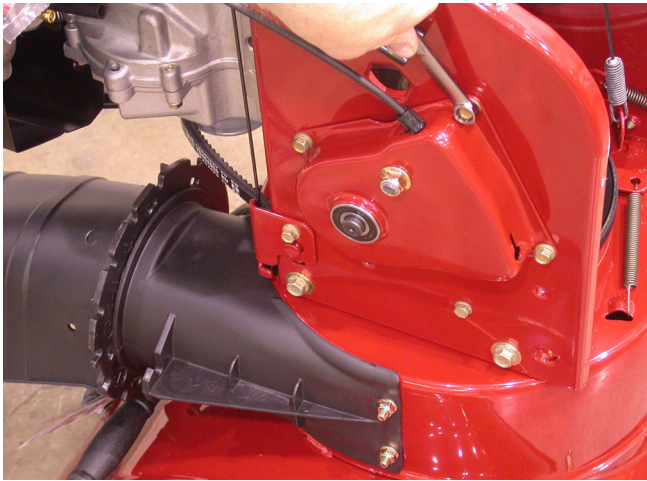


Figure 11.7

- 11.8. In order to remove the housing it may be necessary to squeeze the steering trigger to release the dog assembly from the planetary ring gear.
- 11.9. Rotate the entire friction assembly backwards to free the pin from the slide shifter. See Figure 11.9.

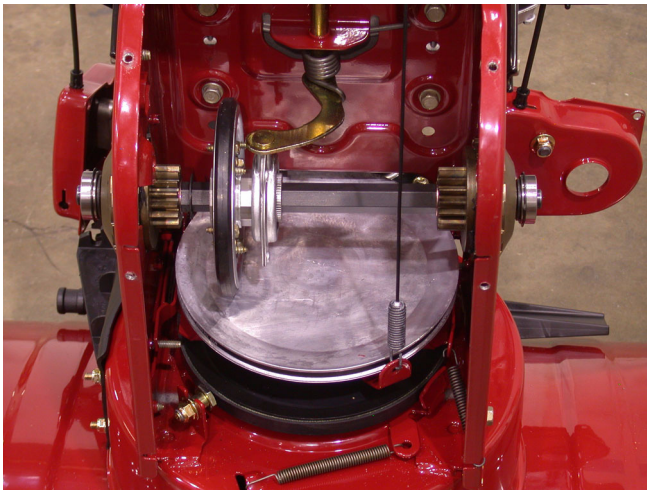


Figure 11.9

- 11.10. Maneuver the entire drive assembly to the left, pivot the right side out of the frame and pull the drive assembly out from the right side. See 11.10..

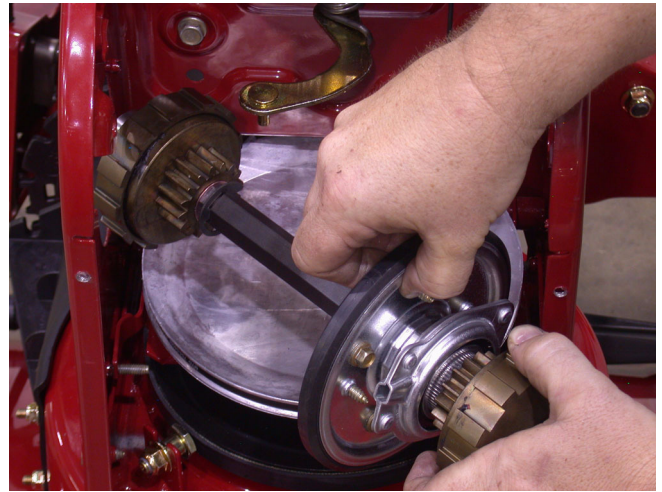


Figure 11.10

- 11.11. The complete drive assembly has two housings on each side commonly referred to as gear clusters. See Figure 11.11.

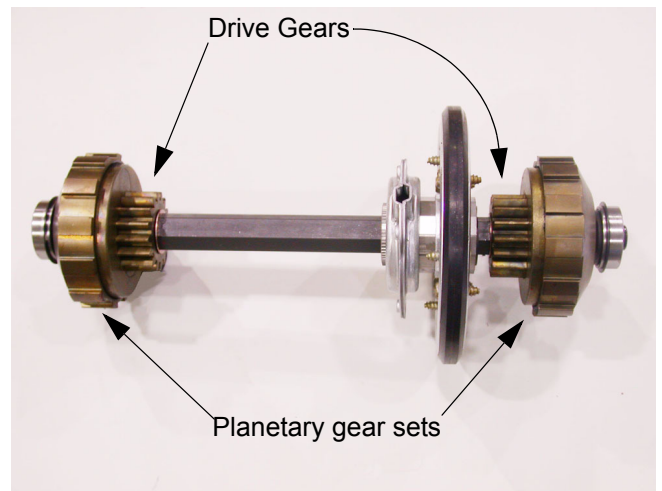


Figure 11.11

NOTE: Each drive gear drives one half of the axle.

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11.12. Inside of each planetary gear set is a series of planetary gears that rotate around a sun gear and rotate inside of the ring gear on the left. See Figure 11.12.

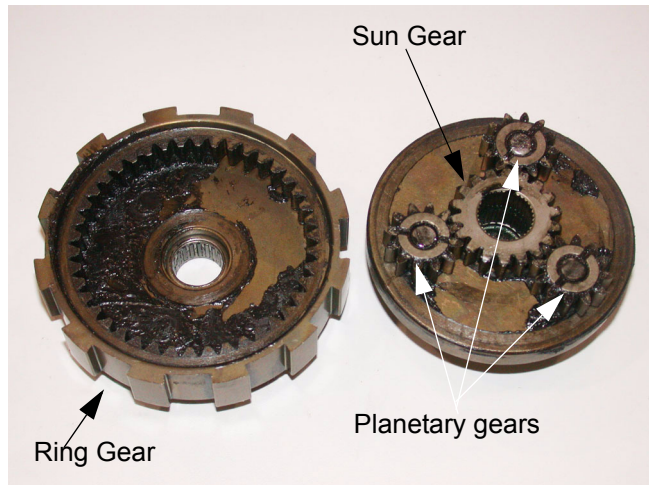


Figure 11.12

NOTE: The grooves in the planetary gears are to facilitate grease to the inner surface of the gear.

11.13. Although the planetary gears rarely have any service issues a good working knowledge is important.

- The hex shaft transfers torque from the rubber drive disc to the sun gear splined on each end of the hex shaft. See Figure 11.13.

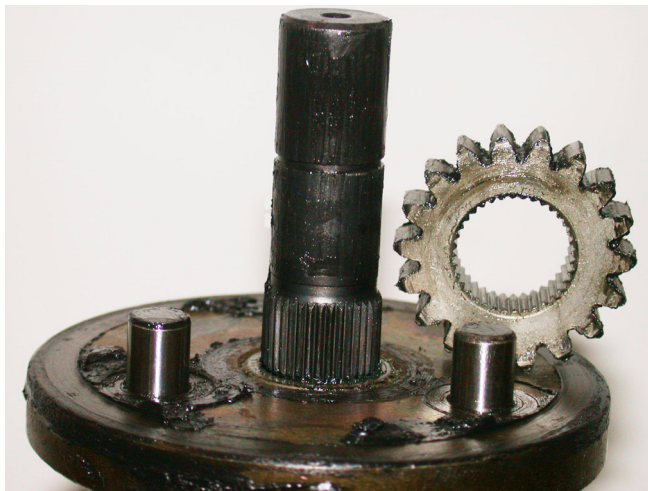


Figure 11.13

- The sun gear drives the planetary gears to rotate on the opposite direction of the sun gear.
- When unlatched (trigger squeezed) the ring gear is then driven in the opposite direction of the planetary gears/same direction as the sun

gear. The ring gear moves slower than the sun gear, but with more Torque because there are more teeth than the sun gear

- When the ring gear is allowed to spin the wheel on that side of the snow thrower is deprived of drive in the ring gear instead of transferring torque to the axle.
- When the trigger is released and the ring gear is latched (prevented from rotating) the planet gears drive the carrier in the opposite direction of the sun gear rotation, but at greater speed.
- The drive gear attached to the carrier transfers power to the axle half.

11.14. engages the carrier that drive the axle

12. PLANETARY GEARS

- 12.1. To inspect or repair the planetary gears it is not necessary to completely remove the drive assembly from the snow thrower.
- 12.2. Stop engine and allow it to cool disconnect the spark plug and ground it to the engine.
- 12.3. Confirm that the fuel level is low enough to prevent spillage through the gas cap vent, or seal the vent with a plastic bag between the cap and the filler neck.
- 12.4. Carefully tip the snow thrower forward so it rests on the auger housing.
- 12.5. Remove the wheel.
- 12.6. Remove the (4) screws that secure the shaft retainer housing with a 3/8" socket. See Figure 12.6.

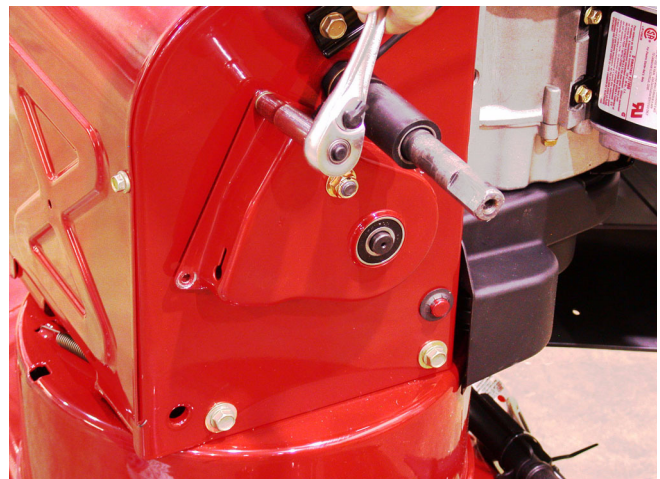


Figure 12.6

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- 12.7. Remove the planetary gear housing from the snow thrower to expose the planetary gear set.
- 12.8. Remove the snap ring and shims off of the shaft. See Figure 12.8.

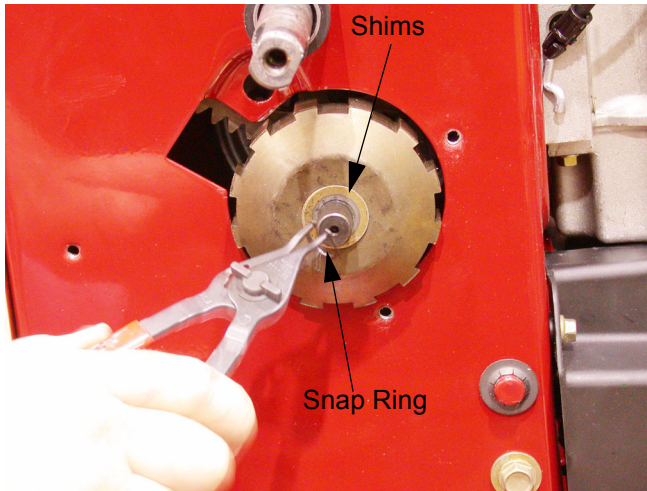


Figure 12.8

- 12.9. Carefully remove the ring gear from the planetary gear set. See Figure 12.9.

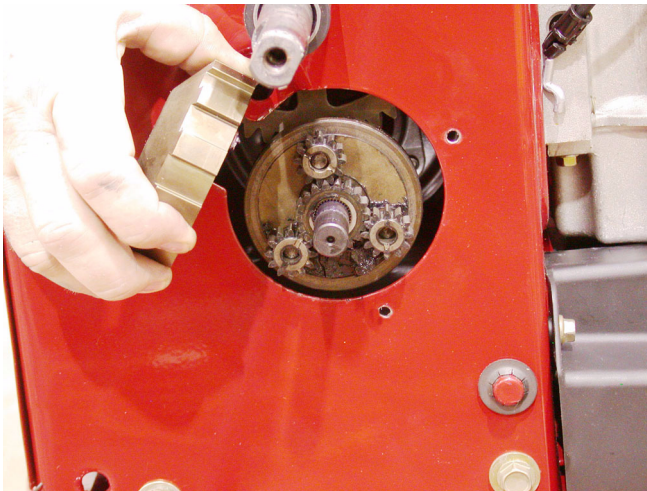


Figure 12.9

NOTE: The planetary gears and sun gear will side off easily.

NOTE: Any time the carrier is taken off the drive assembly check the grease and add a high quality grease suitable for use in sub-zero temperatures to any contact surfaces.

- 12.10. Examine all the gears: If failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.

- 12.11. Install /reinstall gear set by reversing to removal procedure.

- 12.12. Run/test the snow Thrower before returning it to service.

- 12.13. When installing the bearing remember that the wide side faces outward. See Figure 12.13.

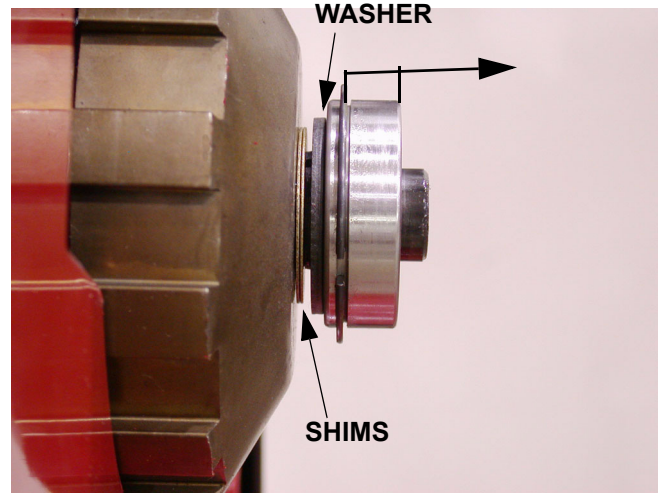


Figure 12.13

13. FRICTION WHEEL REPLACEMENT.

- 13.1. Remove the friction wheel assembly from the machine as described in the drive shaft removal section of this manual.
- 13.2. Split the friction wheel with a 3/8" wrench.

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- 13.3. Examine the removed parts: If it failed because of something other than normal wear, identify and correct the cause before returning to service. See Figure 13.3.



Figure 13.3

- 13.4. Install the rubber friction wheel by reversing the removal procedure.
- 13.5. Run/test the snow thrower before returning to service.
- 13.6. When reassembling the rubber wheel tighten the screw in an alternating order. See Figure 13.6.

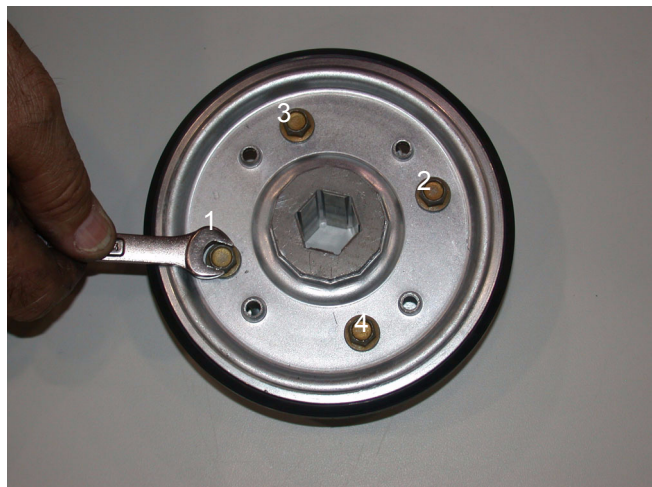


Figure 13.6

- 13.7. When installing the new friction wheel be sure that the rubber ring is secure within the wheel.

NOTE: use a high quality grease suitable for used in sub-zero temperatures on the hex shaft to allow the friction wheel assembly to move across the hex shaft freely.

14. AUGER ASSEMBLY

- 14.1. Remove the screws that fasten the auger housing to the rear portion of the snow thrower with a 1/2" wrench. See Figure 14.1.

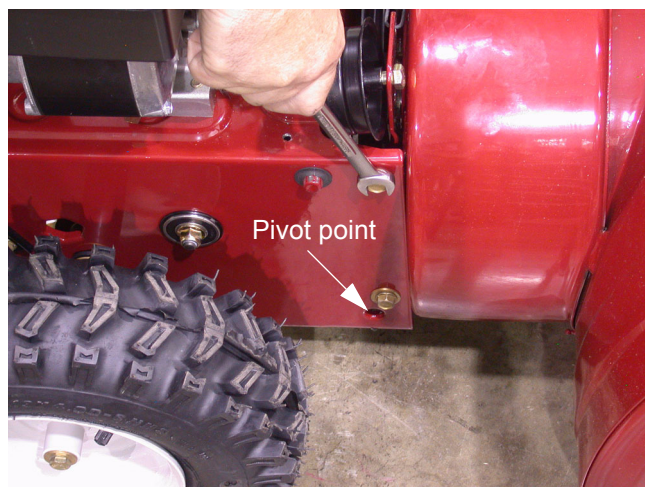


Figure 14.1

NOTE: After the 4 screws (2 on each side) have been removed the 2 parts of the snow thrower will open up like a clam shell there is a pivot point stamped onto each side of the frame.

- 14.2. Work the auger belt off of the auger pulley.
- 14.3. Separate the auger housing from the drive housing.
- 14.4. Use a block of wood to prevent the augers from turning. See Figure 14.4.



Figure 14.4

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- 14.5. Remove the bolt that attaches the auger pulley to the auger shaft with a 9/16" wrench. See Figure 14.5.

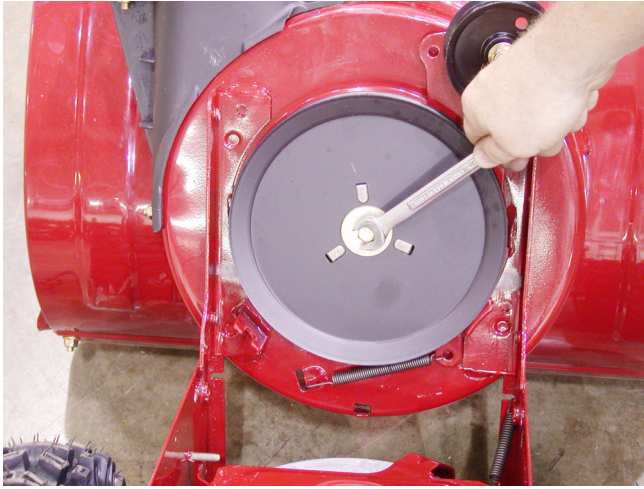


Figure 14.5

- 14.6. The pulley adaptor should slide off of the shaft easily. See Figure 14.6.

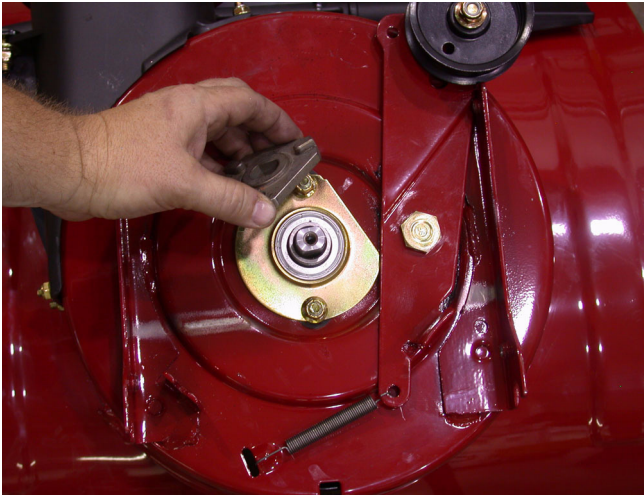


Figure 14.6

- 14.7. Remove the screws holding the Bearing housing on each side. See Figure 14.7.



Figure 14.7

NOTE: This is a good opportunity to inspect the auger bearing for signs of wear.

- 14.8. Pull the Auger from the housing slight rotation of the assembly may be necessary to pull the impeller shaft clear of the rear bearing. See Figure 14.8.



Figure 14.8

NOTE: The most common cause of auger gear-box damages impact with solid objects obscured by snow fall. This damage is not warrantable. Use of proper shear pins helps prevent gearbox damage, but does not guarantee protection.

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- 14.9. Inspect the spacers, and bushings and check for possible damage to augers. See Figure 14.9.

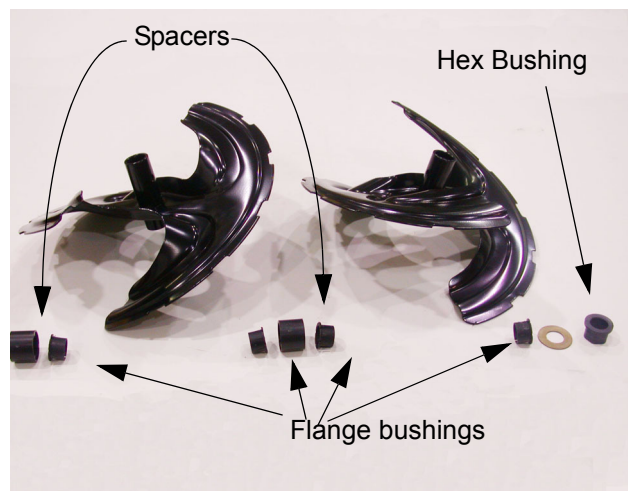


Figure 14.9

- 14.10. Examine the removed auger assembly: If it failed because of something other than normal wear, identify and correct the cause before returning the snow thrower to service.
- 14.11. Install the auger assembly by reversing the removal procedure.
- 14.12. Run/test the auger before returning to service.

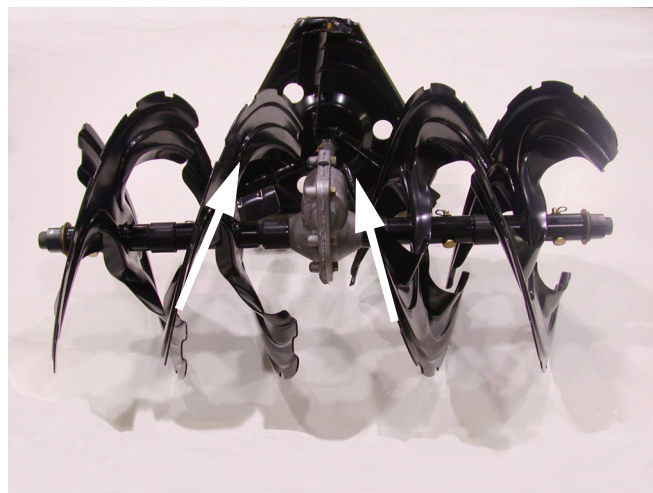


Figure 14.12

NOTE: When the augers are installed correctly the foremost blades will have an inward slant to form an "A" frame

15. REMOVAL OF THE JOYSTICK CHUTE CONTROL

- 15.1. Loosen, but do not remove the (2) screws holding the auger cable with a 3/8" socket. See Figure 15.1.

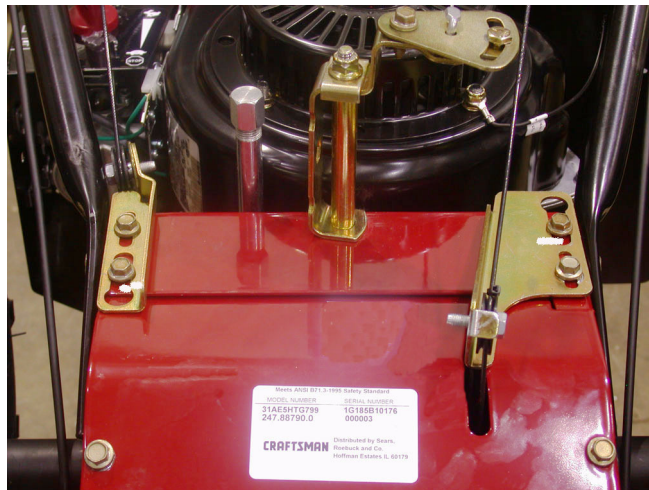


Figure 15.1

NOTE: Make a mark on the adjustment bracket to the machine for reassembly.

- 15.2. Remove the Z-fitting from the Auger handle with a pair of needle nose pliers.
- 15.3. Remove the shoulder bolt with a 3/4" wrench and 1/2" wrench. See Figure 15.3.

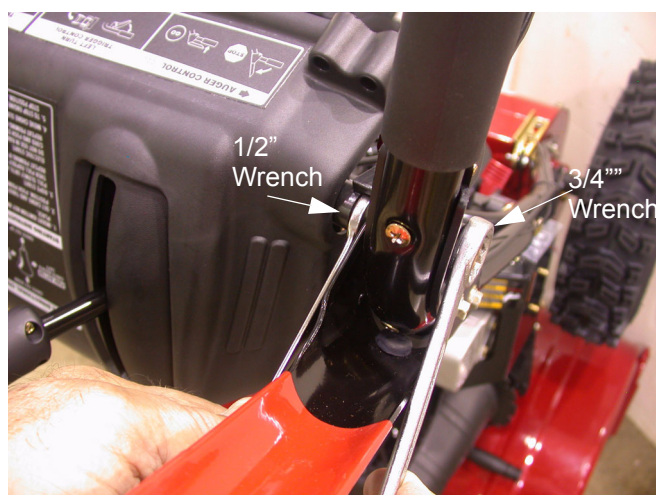


Figure 15.3

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- 15.4. Carefully release the tension from the torsion spring as the bolt withdraws. Some models are equipped with an auger lock, or one hand operation the following image shows the parts of the auger lock feature See Figure 15.4.

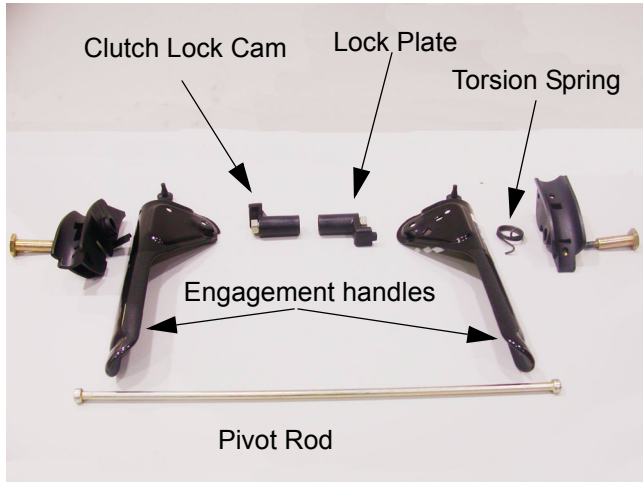


Figure 15.4

- 15.5. repeat steps 15.1, 15.2, and 15.3 to disconnect and remove the traction control lever.
- 15.6. Detach the pivot rod from the clutch lock cam. See Figure 15.6.

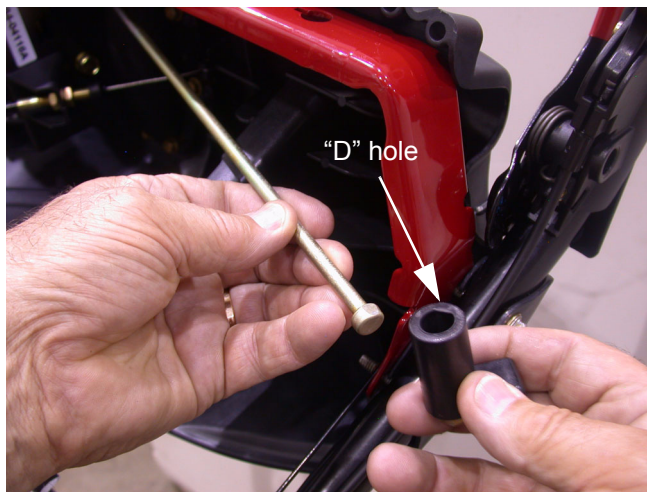


Figure 15.6

NOTE: The flats at each end of the pivot rod fit into the "D" hole in the cam lock.

- 15.7. Remove the (6) screws that fasten the joystick to the dash with a 3/8" socket. a 6" extension may be handy at this time. See Figure 15.7.

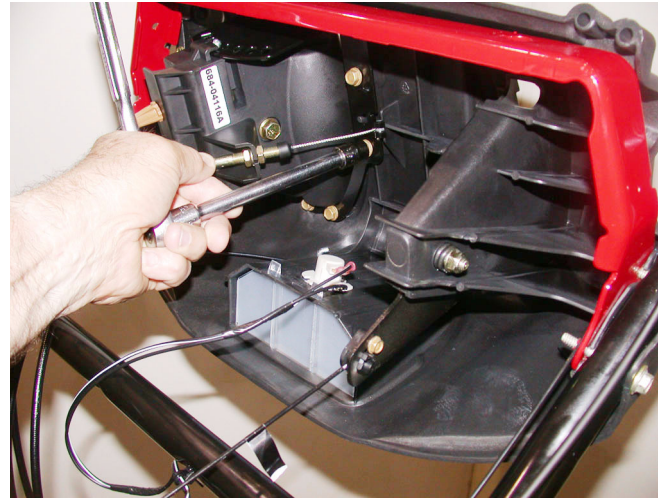


Figure 15.7

- 15.8. The Joystick will drop down towards the bottom of the dash panel.
- 15.9. Slide the cables from the cable retainer positioned on the engine. See Figure 15.9.

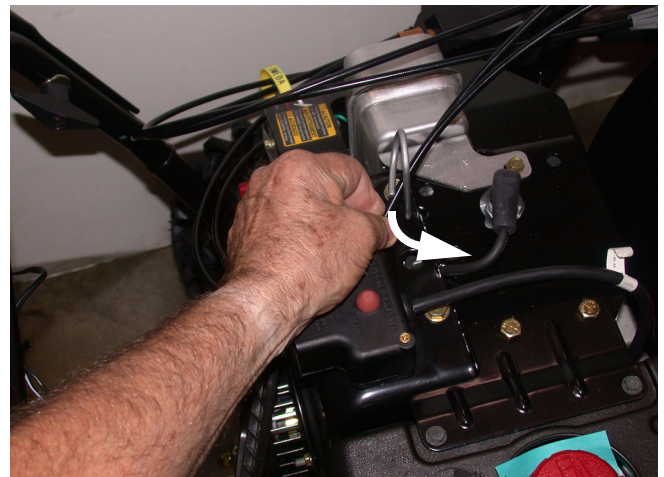


Figure 15.9

- 15.10. Slip the bow tie cotter pin from the clevis pin that holds the pivoting assembly to the support bracket. See Figure 15.10.

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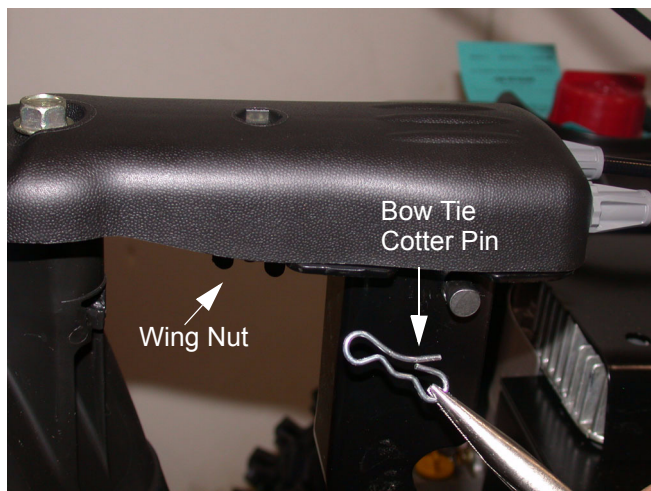


Figure 15.10

- 15.11. Remove the wing nut and screw directly in front of the clevis pin,
- 15.12. Remove the shoulder bolt that secures the pulley cover to the upper discharge chute.

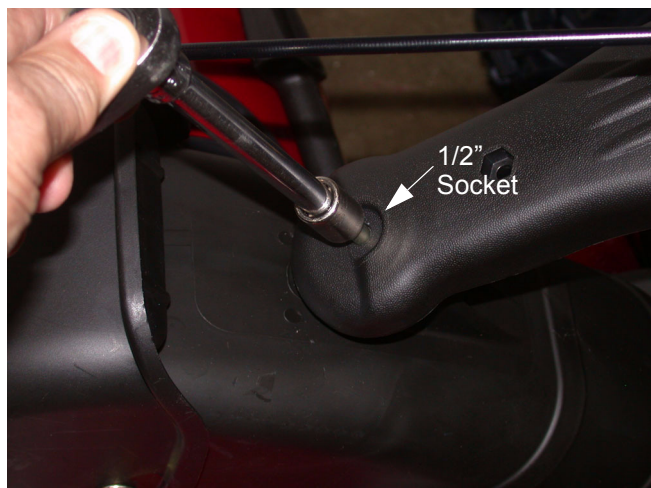


Figure 15.12

- 15.13. The upper discharge chute will lift off of the lower chute. See Figure 15.13.



Figure 15.13

NOTE: There are no chute flange keepers use on models with the joystick chute control.

- 15.14. Remove the nut that secures the chute tilt cable guide with a 1/2 inch socket. See Figure 15.14.



Figure 15.14

- 15.15. Remove the anti-pivot screw located on the inside of the chute with a 3/8 inch socket.

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15.16. Lift the deflector from the anti-pivot hole there are (2) hooks that support the assembly in the deflector. See Figure 15.16.



Figure 15.16

15.17. Examine the removed joystick assembly: If it failed because of something other than normal wear, identify and correct the cause before returning to service.

15.18. Install new joystick assembly by reversing the removal procedure.

15.19. Test/ adjust the cables before returning to service.

15.20. Unwind the cables prior to attaching them to the Snow Thrower. Allow the cables to flow without tangling or twisting. See Figure 15.20.



Figure 15.20

15.21. Twists or kinks in the cable can create a bind in the chute directional control. See Figure 15.21.

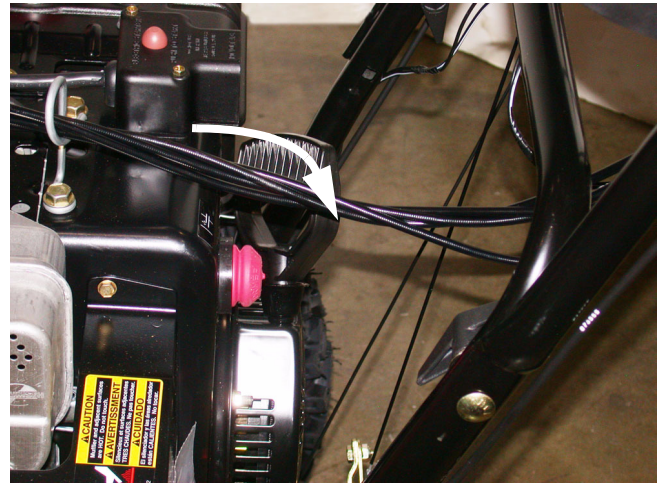


Figure 15.21

16. OPTIONAL LIGHTING

16.1. Some units come equipped with a head lamp. If not originally fitted with a halogen bulb they cannot convert to halogen because the extra heat will melt the housing. See Figure 16.1.



Figure 16.1

16.2. The lamp is set up in a series circuit, and powered from a 12V output stator equipped in the engine.

NOTE: Beginning in the 2005/1 season if a snow thrower is not equipped with a head light there are no provisions to add one.

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17. ELECTRIC START

- 17.1. Some units are equipped with a 120V starter.
See Figure 17.1.

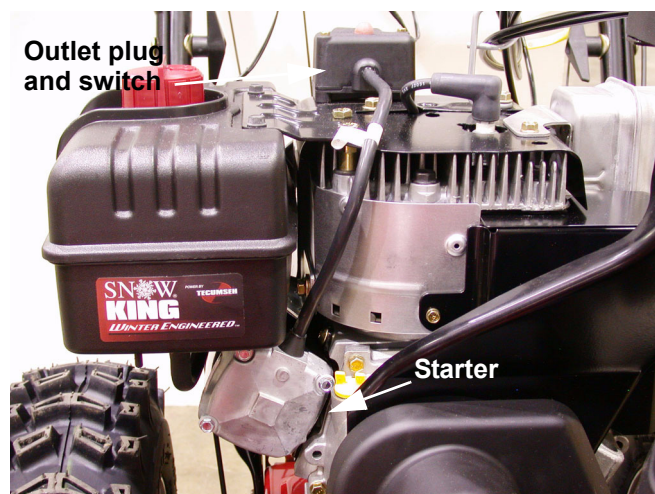


Figure 17.1

- 17.2. The starter is powered by a household 120V outlet.

NOTE: Beginning on the 2005/1 season if a snow thrower is not equipped with a electric starter there are no provisions to add one.